



Naval Health Research Center

Second/Third Quarter

SPRING/SUMMER 2012

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Medical Data to Medical Intelligence

Naval Health Research Center's Near-Real Time Medical Intelligence Capability Using the Expeditionary Medical Encounter Database

NHRC researchers have been capturing and analyzing deployment health data on all tri-service battle, nonbattle, disease, and psychological health casualties incurred during Overseas Contingency Operations (OCOs) since 2003. The capability that was developed to identify and track OCO casualty events is called the tri-service Expeditionary Medical Encounter Database (EMED; formerly known as the Navy-Marine Corps Combat Trauma Registry). As the nation's OCOs evolved, it became apparent that all casualties should be tracked, resulting in the expansion of the EMED program to include all those sick and injured during deployment, including those experiencing mental health effects.

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Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC)

By Mike Galarneau
Department Head
Medical Modeling and Simulation
Department

Naval Health Research Center's Near-Real Time Medical Intelligence Capability Using the Expeditionary Medical Encounter Database

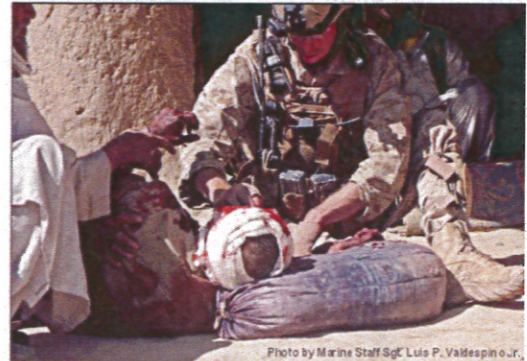
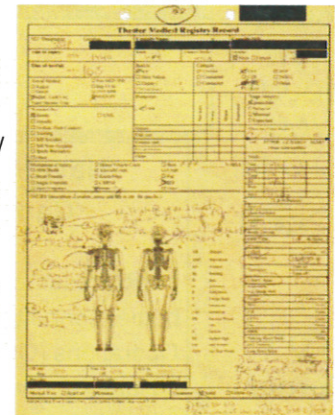


Photo by Marine Staff Sgt. Luis P. Valdespino Jr.

NHRC researchers have been capturing and analyzing deployment health data on all tri-service battle, nonbattle, disease, and psychological health casualties incurred during Overseas Contingency Operations (OCO) since 2003. The capability that was developed to identify and track OCO casualty events is called the tri-service Expeditionary Medical Encounter Database (EMED; formerly known as the Navy-Marine Corps Combat Trauma Registry). As the nation's OCOs evolved, it became apparent that all casualties should be tracked, resulting in the expansion of the EMED program to include all those sick and injured during deployment, including those experiencing mental health effects.

Introduction

During the early days of the EMED program, tracking and recording casualties was very much a paper-based process. Compiling a comprehensive record of injury and treatment across the continuum of care from point of injury/illness to rehabilitative outcome was slow, resulting in reporting delays for casualty events and outcomes to the DoD community. Because the DoD threat reduction and injury mitigation communities require timely data as events occur, the EMED program developed an information technology-based capability that integrates numerous medical, operational, and tactical databases together, forming a near real-time casualty information pipeline beginning at the point of injury/illness immediately following the occurrence of an attack. These data continually stream into NHRC and are integrated, organized, scrubbed by analysts and clinicians, and reported to DoD as injury trends, casualty outcomes, and studies and analyses identifying optimal strategies for maximizing casualty outcomes.



Multiple Sources Expertly Aggregated

While data aggregation has been highly automated, it must be recognized that much of the data is generated in hostile, austere conditions unfavorable to pristine data

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NHRC Visitors



RADM Alton L. Stocks

Commander, Navy Medicine National Capital Area
Commander, Walter Reed National Military Medical Center

RADM Michael H. Anderson

The Medical Officer to the Marine Corps (TMO)
Director, Health Services
U.S. Marine Corps, Headquarters

RADM Elizabeth S. Niemyer

Nurse Corps, United States Navy
Deputy Chief, Wounded, Ill, and Injured
Director, Navy Nurse Corps

Maj Gen (Ret) George Anderson, MD, MPH

Defense Health Board

Dr. Eve Higginbotham

Defense Health Board

Governor John Baldacci

Special Advisor to the Under Secretary of Personnel & Readiness, former Governor and four-term Congressman for the State of Maine

Not pictured: **COL Wayne Hachey, DO, MPH** and **Ms. Hillary Peabody**, Defense Health Board

NHRC Welcome Aboard:

5/16/12 **Mr. Kartavya (Kurt) Vyas**, Henry Jackson Foundation/Research Assistant
Deployment Health Research Department, Dr. Nancy Crum-Cianflone

5/22/12 **Ms. Jennifer Radin**, SAIC/Research Assistant
DoD HIV/AIDS Prevention Program, CAPT Braden Hale

5/23/12 **Ms. Julianne Peters-Hyde**, Axiom/Clinical Analyst
Medical Modeling & Simulation Department, Mr. Mike Galarneau

5/30/12 **Brenda White, LTJG, MSC**/Environmental Health Officer
Operational Infectious Diseases Department, CDR Gary Brice

6/11/12 **Dr. Krista Brooks**, Henry Jackson Foundation/Research Associate
Operational Infectious Diseases Department, CDR Gary Brice

6/11/12 **Ms. Sally Morgan**, Henry Jackson Foundation/IRB Analyst
Institutional Research Board Department, Mr. Chris Blood

6/19/12 **Ms. Emma Schaller**, Henry Jackson Foundation/Research Assistant
Deployment Health Department, Dr. Nancy Crum-Cianflone

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NHRC's New Executive Officer: CAPT Lanny Boswell



Captain Lanny L. Boswell reported aboard Naval Health Research Center as the **Executive Officer** on April 30, 2012.

A native of San Antonio, Texas, he graduated from Southwest Texas State University in 1986. He received a Master of Science in Physical Therapy from the Baylor University Academy of Health Sciences in 1989 and he earned a PhD in Sports Medicine, with an emphasis in Exercise Physiology, from the University of Virginia in 2002.

Captain Boswell is a licensed physical therapist, holds a board-certified specialty in orthopedics, and is a credentialed electromyographer and neuromusculoskeletal primary care provider. His personal awards include the Bronze Star, two Meritorious Service Medals, five Navy and Marine Corps Commendation Medals, two Navy and Marine Corps Achievement Medals, and an Air Force Commendation Medal.

NHRC Conducts Predeployment Training for Navy's Sixth Mobile Care Team

By LCDR Katie Shobe, MSC, USN
Department Head
Behavioral Sciences and Epidemiology Department

The Mobile Care Team (MCT), a centerpiece of the Navy's Combat and Operational Stress Control (COSC) program for combat-deployed sailors, commenced in Fall 2009 following recognition of the need to enhance mental health surveillance and care in theater for Navy Individual Augmentees (IAs). This stemmed in large part from findings of the Behavioral Health Needs Assessment Survey (BHNAS) conducted in Iraq and Afghanistan.

The MCT is currently a 5-person, individually augmented team, assigned to 6-month rotations for execution of COSC surveillance and monitoring activities. Surveillance is conducted via BHNAS, the results of which help the MCT inform in-theater unit leadership regarding stress levels of sailors, unit morale, cohesion, and deployment stressors. NHRC has served as the performing agency for the development, support, and analysis of the BHNAS and data since late 2006.



Two Navy Individual Augmentees from FOB Sharana, Paktika Province, Afghanistan, completing BHNAS surveys, while sharing their own unique IA experiences, March 2012.

In preparation for deployment of the most recent team, MCT6, predeployment training was provided by NHRC, Naval Center for Combat and Operational Stress Control, and Navy Bureau of Medicine and Surgery-M9 Wounded, Ill, and Injured program over 5 days. CDR Ruth Goldberg, LCSW, a team member, said, "I believe that the MCT predeployment training provided by NHRC truly exemplifies proactive leadership. By providing us with the integral training, tools, and resources, NHRC has proved that they are genuinely devoted to this mission, are truly committed to our success as a Mobile Care Team, and, most importantly, are profoundly invested in the well-being of our deployed individual augmentee sailors."

LCDR Katie Shobe led the NHRC portion of predeployment training. LCDR Shobe deployed as part of MCT 2. Other NHRC team members who participated in the training included Ms. Susan Hilton, Ms. Shiloh Beckerley, and Dr. Marc Taylor. MCT 6 instruction focused on the background of BHNAS, the content areas (e.g., mental

(Continued on page 17)

Population-Based Surveillance Among U.S. Military Recruits Seeking Health Care for Acute Gastroenteritis

By Shan Putnam, Ph.D., & Ramona McCaffrey, Ph.D.
Enteric Disease Research Surveillance Program

In early 2011, the Enteric Disease Surveillance Program (EDSP) was established within the NHRC Respiratory Diseases Research Department (now the Operational Infectious Diseases Department). EDSP's focus is to describe the epidemiology of enteric diseases among at-risk U.S. military populations, including recruits and operational forces. Enteric diseases are the most commonly reported health care issues among troops; one of the most debilitating is acute gastroenteritis (AGE).

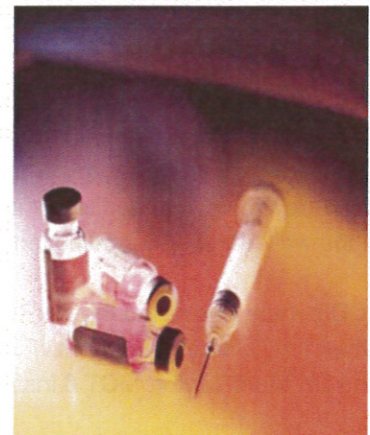
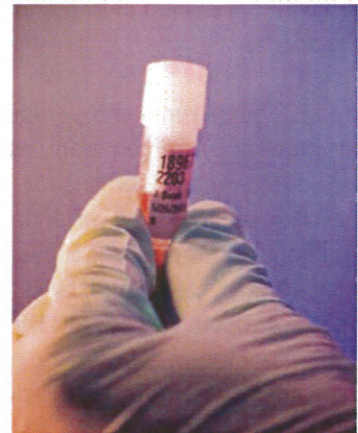
AGE is the rapid onset of diarrheal disease, with or without accompanying symptoms (nausea, vomiting, fever, or abdominal pain). AGE is commonly reported among deployed military populations, and studies show that most cases are likely caused by norovirus (NoV), which causes ~90% of reported nonbacterial AGE outbreaks in Western countries. NoVs are highly contagious and are transmitted via ingestion of contaminated food/drink, as well as person-to-person via aerosols.

EDSP's initial focus was to describe the etiology/epidemiology of AGE among military recruits at Marine Corps Recruit Depot (MCRD) San Diego, MCRD Parris Island, and Recruit Training Command Great Lakes. Surveillance was designed as clinic-based, in which EDSP researchers enrolled, collected, and conducted laboratory testing on specimens from recruits seeking medical care for AGE. EDSP also tested clinical specimens collected from personnel deployed on USNS *Comfort* during Operation Continuing Promise 2011 and specimens collected during a large AGE outbreak at the U.S. Air Force Academy in Colorado Springs, Colorado, in 2011.

Laboratory testing (standardized bacterial culture techniques and molecular assays) targeted priority pathogens known to cause diarrhea and/or vomiting in both sporadic and epidemic AGE.

Through February 2012, ESP enrolled 239 AGE cases. In 38% of these, an enteric pathogen was identified. NoV was the most common, present in 32% of the cases. Overall, a total of 16 *Salmonella* strains were isolated from study participants; 11 from MCRD San Diego and 5 from MCRD Parris Island. Of special note, from November to December 2011, EDSP, in collaboration with San Diego County Public Health and the California State Laboratory, identified and typed 10 *Salmonella* cases, defining a unique cluster of cases among recruits stationed only at MCRD San Diego. These cases prompted the Naval Medical Center San Diego Preventive Medicine Department to conduct inspections, leading to modifications in berthing and kitchen areas, thus controlling further spread.

In summary, AGE significantly impacts military personnel, and NoV is a primary etiological agent. NoV is an important health threat to the DoD, and it affects both deployed ground and shipboard populations and recruits. Unfortunately, we know little about the epidemiology and effectiveness of outbreak control measures, especially those caused by NoV. Therefore, the purpose of this program is to establish AGE surveillance in at-risk military populations, with the specific goals of quantifying disease burden and operational impact, developing a diagnostics platform, and evaluating therapeutic and/or prophylactic products to limit the impact of gastroenteritis on U.S. forces afloat and ashore.



COMMAND HIGHLIGHTS

30 JAN 2012: Dr. Marc Taylor attended the 2012 Joint Personnel Recovery Agency and Survival, Evasion, Resistance, Escape (SERE) Psychology Conference in Quantico, Virginia 24–26 JAN. Members of the Behavioral Sciences and Epidemiology Department (Taylor, Larson, and Wilson) authored an invited presentation titled "Coping Strategies During SERE: Antecedents, Outcomes, and Physiological Correlates."

5–8 MAR 2012: Dr. Nancy Crum-Cianflone co-authored and presented four posters for the 19th Conference on Retroviruses and Opportunistic Infections (CROI) in Seattle, Washington (studies initiated at Naval Medical Center San Diego):

"Decreased MRSA-Specific CD4+ T Cell Responses May Explain Predisposition to MRSA SSTI Among HIV+ Persons"

"Baseline Creatinine-Based eGFR and CC as Predictors of Clinical Events: SMART Study"

"Identification of an Abbreviated Test Battery for Detection of HIV-Associated Neurocognitive Impairment in an Early-Treated HIV+ Cohort"

"An Early Diagnosed and Treated HIV Cohort Shows Low Rates of Neurocognitive Impairment"

9 MAR 2012: The Deployment Health Research Department provided an update that 182,942 participants have been enrolled in the Millennium Cohort Study during the current survey cycle. The Family Study has approximately 2,480 spouses, with enrollment continuing.

22 MAR 2012: Dr. Nancy Crum-Cianflone was interviewed by *USA Today* regarding the Millennium Cohort Study. She provided an overview of the study's objective.

20 MAR 2012: The Air Force Surgeon General's Office inquired about the Birth and Infant Health Registry. They are seeking studies looking at potential birth defects and military exposures, after an Air Force physician had expressed concern that exposure to pollutants in Iraq may have led to birth defects in his patients' children.

20 MAR 2012: NHRC was able to obtain virtual private network access approvals from Naval Medical Center San Diego for the first tier of users (across the R&D Enterprise) of the Enterprise Research Project Manager. Access for the remainder of the anticipated users (approximately 120 additional users across 8 labs) is in process.

19 APR 2012: Members of the Behavioral Sciences and Epidemiology Department provided an informational brief to Naval Special Warfare Group 1 SEAL Operators and then began data collection for their study, "Sleep Disruption in Navy SEAL Operators."

20 APR 2012: Dr. Nancy Crum-Cianflone served as a judge for the Academic Research Competition at Naval Medical Center San Diego. Other judges included Dr. Margaret A.K. Ryan, CAPT (ret), and Dr. Wayman W. Cheatham, Special Assistant to the Navy Surgeon General for Medical R&D. CAPT Gregory Utz, NHRC CO, and Dr. Karl Van Orden, NHRC Director of Research and Development, met with RDML C. Forrest Faison, III, Commander NAVMEDWEST; Dr. J.D. Malone, Director of Clinical Research at NAVMEDWEST/NMCS; and Dr. Cheatham to discuss research initiatives. Several of the residents in training in the Graduate Medical Program, Clinical Investigations Program, made presentations utilizing NHRC personnel and existing NHRC databases/studies.

U.S. CENTCOM

Joint Combat Casualty Research Team



By LT Jacob Norris
Research Psychologist
Warfighter Performance Department

During the period of March 2011 to March 2012, at Camp Leatherneck, Helmand Province, Afghanistan, I was deployed as an acting senior scientist on the U.S. Central Command (CENTCOM) Joint Combat Casualty Research Team (JC2RT). The tri-service team was composed of 12 medical professionals and research scientists, and its mission was to facilitate the conduct of medical research in the CENTCOM area of responsibility. We oversaw all human subjects research efforts across CENTCOM's area of responsibility, including Iraq, Kuwait, and Qatar. All team members were located in Afghanistan. I was located in Regional Command Southwest at Camp Leatherneck. I was co-located with two Air Force scientist providers who covered nearby medical facilities at Camp Bastion and Camp Dwyer. Because I was embedded in the Navy-Marine Corps proof-of-concept Concussion Restoration Care Center (CRCC), I primarily acted in direct support of the 2nd MAGTF Support Battalion, 2nd Marine Logistics Group (FWD) and its Navy providers.

"For the warfighters, the establishment of a research program at the Concussion Restoration Care Center (CRCC) means they will receive better evidence-based health care that leverages the scientific acumen of all the services. Specifically, military medicine and CENTCOM providers know more today about the recovery process that occurs in the days and weeks following uncomplicated mTBI than ever before. We have enhanced our capabilities to assess physically and psychologically wounded patients and make appropriate return-to-duty decisions."

LT Jacob Norris
Research Psychologist
Warfighter Performance Department
Camp Leatherneck
Helmand Province, Afghanistan
March 2011 – March 2012

Much has been written about the CRCC already: It represents the first attempt by the Navy and Marine Corps, and DoD, to provide comprehensive in-theater assessment and care for mild traumatic brain injury (mTBI). Even though I was deployed as part of a joint mission and had Army and Air Force leadership, coming from Navy Medicine and being able to give direct support to a Navy Medicine and Headquarters Marine Corps effort in an operational setting was a phenomenal experience.

A large portion of my mission was spent helping the clinicians establish an efficient medical research program compliant with the CENTCOM Human Research Protection Program and build the scaffolding that would facilitate projects that would enhance assessment and treatment of mTBI. As a rule, any research had to balance the trade-offs between footprint and impactful research. Having the bench-level experience at a naval medical research laboratory was very helpful in that regard. As part of its culture, Naval Health Research Center scientists are taught to meet the needs of the operational and clinical communities. To be clear, the CRCC's primary mission is patient care for mTBI and musculoskeletal injury, the most common battle and nonbattle injuries in Operation Enduring Freedom.

search Center scientists are taught to meet the needs of the operational and clinical communities. To be clear, the CRCC's primary mission is patient care for mTBI and musculoskeletal injury, the most common battle and nonbattle injuries in Operation Enduring Freedom.

I don't think I could have operated in a more research-friendly environment. BG Michael Dana, Commanding General, 2nd Marine Logistics Group (FWD), and BG John J. Broadmeadow, Commanding General, 1st Marine Logistics Group (FWD), were always very supportive of the JC2RT mission because of its potential to benefit Marines

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PRESS RELEASE

By Dr. Nancy Crum-Cianflone
Department Head
Deployment Health Research Department

Over 180,000 Service Members and Veterans now Participating in the Millennium Cohort Study

Over 180,000 service members and veterans are currently participating in the Millennium Cohort Study conducted by researchers at the Naval Health Research Center (NHRC). The study team expects to surpass the 200,000-participant mark by the end of this year.



"As force health protection continues to be a priority for the future of the U.S. military, the Millennium Cohort Study will be providing critical information toward enhancing the health of future generations of military members," said Dr. Nancy Crum-Cianflone, principal investigator of the Millennium Cohort Study and department head of the NHRC Deployment Health Research Department.

In response to health concerns related to military members about deployment and other service-related experiences, DoD initiated the Millennium Cohort Study—the largest prospective study ever undertaken in the U.S. military. Launched in 2001, the goal of this study is to create a cohort that best represents all service members, as well as the broad scope of military experiences.

"Participants are asked to complete one survey every 3 years, up through the year 2022," said Dr. Crum-Cianflone. "This is necessary in order to follow developments in health over an extended period of time. While approximately 30% of Cohort participants have left military service, they remain active members of the Cohort."

The study team has been incredibly productive in providing the DoD, Department of Veterans Affairs, and scientific community with information through more than 50 publications and 200 presentations. Here are some of the recent findings:

- Physical activity, especially vigorous activity, for at least 20 minutes, twice weekly, was associated with a decreased odds of reporting posttraumatic stress disorder (PTSD) symptoms.
- Service members deployed to Iraq and Afghanistan may experience problems with their sleep both during and after deployment. Data showed they were 28% more likely to have trouble sleeping than nondeployed service members.
- Mental health status before a stressful experience, such as combat experience during deployment, might affect the reaction during the traumatic event and coping strategies after the event, and may explain why some members develop conditions such as PTSD postdeployment.
- Findings showed that personnel deploying to the operations in Iraq and Afghanistan had a higher rate of persistent or recurring cough or shortness of breath (14%) than nondeployers (10%). However, there were no indicators for an increased risk for asthma, chronic bronchitis, or emphysema. Follow-up studies are under way.

In addition to the service member study, the NHRC team launched the Millennium Cohort Family Study in 2011. The purpose of the Family Study is to gain a more complete understanding of the military experience and its impact on the health and well-being of service members and their families. Individuals included in the Family Study are the spouses of participants in the Millennium Cohort Study (our "parent" study) who agreed to enroll in the Family Study. Participation in the Family Study is completely voluntary. Currently over 2,500 military spouses are enrolled.

NHRC in San Diego conducts research in the medical and psychological aspects of health and performance of military personnel.

HIGH-LEVEL BRIEFS

10 JAN 2012: Mr. Vern Wing and Mr. Martin Hill met with the Third Fleet Surgeon (CAPT Daryl Daniels) and his team (LCDR Patty Serrano and HMCM Jeffery Dell) to demonstrate Tactical Medical Logistics Plus Planning Tool (TML+) functionality and to discuss possible analytic support that NHRC can provide to Third Fleet.

23 JAN 2012: Defense Health Board members Maj Gen George K. Anderson, USAF, MC (Ret.); Dr. Eve Higginbotham; COL Wayne Hachey; and Ms. Hillary Peabody visited NHRC and met the Commanding Officer, (CAPT Gregory Utz) Executive Officer (CAPT Douglas Forcino), and with the following departments: Deployment Health Research (Dr. Nancy Crum-Cianflone), Behavioral Sciences and Epidemiology (LCDR Katie Shobe), Medical Modeling & Simulation (Mr. Mike Galarneau), DoD HIV/AIDS Prevention Program (Dr. Rick Shaffer), Operational Infectious Diseases (CDR Patrick Blair), and Warfighter Performance (CAPT Lanny Boswell).

25 JAN 2012: NHRC's Dr. Chris Johnson (Warfighter Performance Department) briefed RADM Elizabeth S. Niemyer, Navy Nurse Corps, Deputy Chief, Navy Bureau of Medicine and Surgery, Wounded, Ill, and Injured (BUMED-M9), and Director, Navy Nurse Corps, "Behavior Health and Operational Benefits of Infantry Immersive Training (IIT)." This project is funded by the Office of Naval Research and BUMED-M9.

26 JAN 2012: Special Advisor to the Undersecretary of Personnel and Readiness (P&R), former governor and four-term congressman from the State of Maine, John Baldacci, visited NHRC and was briefed by NHRC's Commanding Officer CAPT Gregory Utz, MD; Executive Officer CAPT C. Douglas Forcino, MSC, USN; Director of Research and Development Dr. Karl Van Orden; Mr. Mike Galarneau (Department Head, Medical Modeling & Simulation); CAPT Lanny Boswell (Department Head, Warfighter Performance); Ms. Suzanne Hurtado (Behavioral Sciences and Epidemiology Department); CAPT Braden Hale (DoD HIV/AIDS Prevention Program); and CDR Patrick Blair (Department Head, Operational Infectious Diseases).

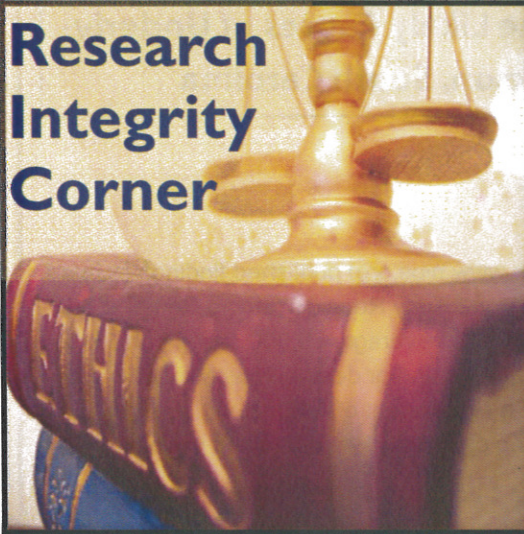
14 FEB 2012: Dr. Chris Johnson, Dr. Nate Thom, and Mr. Chris DeMuro (Warfighter Performance Department) met with the Assistant Commandant of the Marine Corps, Gen. Joseph Dunford, and Mr. George Solhan (Senior Executive Service, Deputy Chief of Naval Research) from Office of Naval Research (ONR) Code 30 (Expeditionary Maneuver Warfare & Combating Terrorism Department), and Mr. Clarke Lethin, program manager for ONR Code 30. The purpose of the meeting was to present a brief on initial findings and recommended future directions for NHRC's recently completed study evaluating the effects of mindfulness-based cognitive training on responses to stress in Marines preparing for combat deployment.

15 FEB 2012: RADM Elizabeth S. Niemyer, Navy Nurse Corps, Deputy Chief, Navy Bureau of Medicine and Surgery, Wounded, Ill, and Injured (BUMED-M9), and Director, Navy Nurse Corps, visited NHRC to meet with Commanding Officer CAPT Gregory Utz, MD, and Executive Officer CAPT Douglas Forcino, MSC, USN, and received briefings on a dozen Wounded, Ill, and Injured projects as well as general briefings from the Commanding Officer, the Behavioral Sciences and Epidemiology Department, the Warfighter Performance Department, the Medical Modeling & Simulation Department, and the Deployment Health Research Department.

22 FEB 2012: RADM Alton L. Stocks, USN, MC, Commander, Navy Medicine National Capital Area Com

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Research Integrity Corner



Can you recognize Research Misconduct?

Research Ethics Corner:

“Can you Recognize Research Misconduct?”

While reading a colleague's recently published article, you realize an important set of data you collaborated on was not included in the analysis. If your data had been included, the results would have contradicted his paper's conclusions. Is this a case of research misconduct?.....Maybe.

Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. [42 CFR Part 93](#) further defines these areas as:

Fabrication: Making up data or results and recording or reporting them.

Falsification: Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

Plagiarism: The appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

A finding of research misconduct requires that all the following be present:

- There be a significant departure from accepted practices of the relevant research community
- The misconduct be committed intentionally, knowingly, or recklessly
- The allegation be proved by a preponderance of the evidence.

It is important to remember that research misconduct **does not include honest error or differences of opinion.**

If you suspect research misconduct, contact NHRC's Research Integrity Leaders Dr. Karl Van Orden or CDR Deborah White.

Information provided by http://grants.nih.gov/grants/research_integrity/research_misconduct.htm

Department of Defense Investigators Determine Likely Causes of Underlying 2011 Influenza Outbreak at Fort Jackson, South Carolina

By Dr. Nancy Crum-Cianflone
Department Head
Deployment Health Research Department

The open-access biomedical journal *PLoS One* (Public Library of Science; www.plos.org) published findings from a team led by NHRC scientists that document a large outbreak of influenza at the Army Recruit Training Center, Fort Jackson, South Carolina, in January 2011. Influenza A and B viruses result in, on average, 36,000 cases of mild to severe illness in the United States each year, at times leading to hospitalizations and/or deaths, mostly in infants or older patients. The 2009 influenza pandemic, instigated by an outbreak of a new variant of A/H1N1 virus (pH1N1), was noteworthy given the high percentage of morbidity and mortality among previously healthy young people.

Influenza vaccination provides protection against 2 influenza A viruses and 1 influenza B virus. Mutations in the extracellular receptors of influenza viruses, as a result of deficient "proofreading" mechanisms, cause antigenic "drift" from the vaccine strain, necessitating annual changes. To counter outbreaks of influenza, DoD inoculates newly arriving recruits with either the trivalent inactivated influenza vaccine (TIV) or, due to its earlier availability, the live, attenuated influenza vaccine (LAIV). In early 2011, febrile respiratory illness surveillance conducted by NHRC researchers and supported by the Armed Forces Health Surveillance Center, evidenced 64 pH1N1 cases, including 1 death, among LAIV-vaccinated recruits at Fort Jackson. Few cases of influenza A/H3N2 or influenza B occurred in this population, although all 3 viruses circulated in the region (see CA Myers et al. Clin Infect Dis, 2011;(2):207-8). These findings suggest reduced effectiveness for the pH1N1 component of the 2010–2011 influenza vaccine.

To understand the contributing factors behind the increased rates of pH1N1 infection during the outbreak, investigators undertook a serological study to describe the corresponding antibody responses. Sera were drawn 4–5 weeks postvaccination from recruits at Fort Jackson, the Marine Corps Recruit Depot Parris Island, South Carolina, and the Coast Guard Training Center, Cape May, New Jersey. Specialized tests utilizing reagents prepared by the U.S. Centers for Disease Control and Prevention were conducted on paired sera. Additionally, contemporaneous influenza isolates were genetically analyzed for changes in the hemagglutination gene. In the *PLoS* publication, the investigators showed that the level and affinity of serum antibodies generated in response to influenza vaccination in the recruit population varied by vaccine type (TIV vs. LAIV) and differed significantly when the locally circulating pH1N1 virus was compared with the vaccine strain. The authors concluded that decreased serologic response among recruits corresponded to modest antigenic drift in the subclade of pH1N1 viruses circulating at Fort Jackson in 2011.

The implications these findings will have on the 2011–2012 influenza season remain uncertain.

CDR Dennis J. Faix, MC, USN, the lead author of the *PLoS* publication commented, "The current influenza season has been unusual. There have been very few influenza cases in the continental United States, so it is difficult to determine whether the pH1N1 subclade involved in the 2011 outbreak at Fort Jackson has become the predominant or fixed strain."

CDR Patrick J. Blair, MSC, USN, of the Operational Infectious Diseases Department at NHRC, added, "Recruits are a special population. We have little understanding of the effects of stress, crowded environments, and multiple and simultaneous vaccinations on their ability to mount an effective immune response."

In this instance, modest drift in the infecting subclade tipped the balance of protection following LAIV vaccination."

This work emphasizes the need for continuous surveillance tied to timely virus characterization and agile production of vaccines and therapeutics in response to ever-adapting influenza viruses.

NHRC RECENT PUBLICATIONS

MacGregor AJ, Mayo JA, Dougherty AL, Girard PJ, Galarneau MR. Injuries sustained in noncombat motor vehicle accidents during Operation Iraqi Freedom. *Injury*. 2012 Sep;43(9):1551-5. Epub 2011 May 25.

Eskridge SL, Macera CA, Galarneau MR, Holbrook TL, Woodruff SI, MacGregor AJ, Morton DJ, Shaffer RA. Injuries from combat explosions in Iraq: injury type, location, and severity. *Injury* 2012 Jul 4 [Epub ahead of print].

MacGregor AJ, Dougherty AL, Mayo JA, Rauh MJ, Galarneau MR. Occupational correlates of low back pain among U.S. Marines following combat deployment. *Mil Med*. 2012 Jul;177(7):845-9.

Schmied EA, Highfill-McRoy RM, Larson GE. Mental health and turnover following an initial term of military service. *Mil Med*. 2012 Jul;177(7):766-72.

Broderick MP, Hansen CJ, Faix DJ. Factors associated with loss of penicillin G concentrations in serum after intramuscular benzathine penicillin G injection: a meta-analysis. *Pediatr Infect Dis J*. 2012 Jul;31(7):722-5.

MacGregor AJ, Dougherty AL, Tang JJ, Galarneau MR. Postconcussive symptom reporting among US combat veterans with mild traumatic brain injury from Operation Iraqi Freedom. *J Head Trauma Rehabil*. 2012 Jun 8 [Epub ahead of print].

Woolpert T, Brodine S, Lemus H, Waalen J, Blair P, Faix D. Determination of clinical and demographic predictors of laboratory-confirmed influenza with subtype analysis. *BMC Infect Dis*. 2012 Jun 7;12:129.

Smith B, Wong CA, Boyko EJ, Phillips CJ, Gackstetter GD, Ryan MA, Smith TC; for the Millennium Cohort Study Team. The effect of exposure to documented open-air burn pits on respiratory health among deployers of the Millennium Cohort Study. *J Occup Environ Med*. 2012 Jun;54(6):708-16.

Powell TM, Smith TC, Jacobson IG, Boyko EJ, Hooper TI, Gackstetter GD, Phillips CJ, Smith B; for the Millennium Cohort Study Team. Prospective assess

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PRESENTATIONS

Twenty NHRC scientists and researchers attended the Military Health Systems Research Symposium (MHSRS) in Fort Lauderdale, Florida, from August 13–16, 2012. Oral presentations included:

- Jamie Horton—Trajectories of Trauma Symptoms and Resilience in Deployed US Military Service Members
- Karen Kelly—Load-Carrying Lumbar Spine Kinematics in Active-Duty Marines
- Pinata Sessoms—Measurement of Head Stabilization During Walking of Persons With Amputation and Traumatic Brain Injury
- Anthony Hawksworth—Impact of Adenovirus Vaccine Resumption at Basic Training Centers, 2011–12
- Mary Clouser—An Analysis of Dismounted Traumatic Amputees in the US Army and Marine Corps
- Amber Seelig—Health Effects of Poor sleep: An Investigation of New Onset Mental Illness in Relation to Sleep Patterns in the Millennium Cohort Study

In addition to the 6 oral presentations, 11 poster sessions were presented by NHRC researchers at the MHSRS conference.

NHRC IN THE NEWS

AAAS Science Magazine

January 23, 2012

AAAS Science Magazine interviewed NHRC's CDR Patrick Blair. CDR Blair discussed the work done at NHRC that discovered H1N1, his work with the Centers for Disease Control and Prevention to address the issue later, and his work at NHRC conducting studies and surveillance efforts that are designed to elucidate novel sequences and phenotypes. A story in *AAAS Science Magazine* about the altered H5N1 viruses made in labs to transmit more efficiently between humans prompted NHRC's response.

USA Today

March 20, 2012

Dr. Nancy Crum-Cianflone provided a brief overview and history of the Millennium Cohort Study (MILCO). She provided information on what issues the survey questions address and how often service members are re-surveyed. She indicated MILCO is a population health study, aimed at looking into outcomes as a function of exposures service members' experience.

San Diego Union Tribune

June 5, 2012

Dr. Jerry Larson and Dr. Heidi Kraft, of the Behavioral Sciences and Epidemiology Department, were interviewed by the *San Diego Union Tribune* about the graphic novel "The Docs." They also answered questions about their professional background and how authentic the content must be in order for it to be useful to the military reader and 18- to 24-year-old demographic for which "The Docs" is intended. The article is available online: <http://www.utsandiego.com/news/2012/jun/23/graphic-novel-the-docs-preps-deploying-corpsmen/>

Pacific Standard

June 18, 2012

Dr. Chris Johnson, of the Warfighter Performance Department, is included in the *Pacific Standard* online story, "A State of Military Mind." Dr. Johnson's groundbreaking research on mindfulness training for military service members is discussed, as are the results that, according to Dr. Johnson, "suggest that mindfulness training can produce changes at the level of brain, biology and behavior, which is quite provocative." The article is available online: <http://www.psmag.com/health/a-state-military-mind-42839/>

The Seattle Times

August 11, 2012

Ms. Robyn McRoy, of the Behavioral Sciences and Epidemiology Department, was mentioned as part of a larger story titled, "Troubled veterans left without health-care benefits." Ms. McRoy co-authored a study that surveyed more than 90,000 Marines. Results of this study suggested that Marines who received a PTSD diagnosis and served in combat zones were 11 times more likely to receive a misconduct discharge. The article is available online: http://seattletimes.nwsourc.com/html/localnews/2018894574_vets12m.html

Publications

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ment of chronic multisymptom illness reporting possibly associated with open-air burn pit smoke exposure in Iraq. *J Occup Environ Med.* 2012 Jun;54(6):682-8.

Jones KA, Smith B, Granado NS, Boyko EJ, Gackstetter GD, Ryan MA, Phillips CJ, Smith TC; for the Millennium Cohort Study Team. Newly reported lupus and rheumatoid arthritis in relation to deployment within proximity to a document open-air burn pit in Iraq. *J Occup Environ Med.* 2012 Jun;54(6):698-707.

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Melcer T, Walker GJ, Sechriest VF II, Galarneau M, Konoske P, Pyo J. Short-term physical and mental health outcomes for combat amputee and nonamputee extremity injury patients. *Vaccine.* 2012 Apr 26;30(20):3090-6. Epub 2012 Mar 6.

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Wells TS, Ryan MA, Jones KA, Hooper TI, Boyko EJ, Jacobson IG, Smith TC, Gackstetter GD. A comparison of mental health outcomes in persons entering U.S. military service before and after September 11, 2001. *J Trauma Stress.* 2012 Feb;25(1):17-24. doi: 10.1002/jts.21657.

Andrews JA, Neises KD. Cells, biomarkers, and post-traumatic stress disorder: evidence for peripheral involvement in a central disease. *J Neurochem.* 2012 Jan;120(1):26-36.

CENTCOM

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and sailors. They were pleased to know that CENTCOM as a regional combatant command values medical research and has dedicated research scientists. The II Marine Expeditionary Force MEF (FWD) Surgeon, CAPT Jeffery Timby, valued our presence because we provided II MEF (FWD) CG John A. Toolan a level of assurance that in-theater research processes were aligned with DoD and federal regulations.

With respect to the successes of the team and its mission, I think my replacement, CDR Gail Chapman (U.S. Army Medical Research and Materiel Command, Fort Detrick, Maryland), a Navy Medical Service Corps scientist, will be able to highlight some major accomplishments in the next few months. Groundbreaking studies will be conducted at the CRCC that could really alter how we diagnosis, assess, and care for service members with mTBI.

In the short term, the primary success of my colleague, Maj Melinda Eaton, USAF, and I were to help to build a program of research in coordination with the CRCC and the 2nd Marine Logistics Group (FWD). Notably, in the last several months, we've been able to produce a case series that characterizes syncope following blast-related concussion and the APGAC (ANAM [Automated Neuropsychological Assessment Metrics] Prognostic Guide for Acute Concussion), a clinical guide for the prognostic use of the ANAM 4 TBI battery during recovery from mTBI, which has been introduced at both the CRCC and the new Warrior Recovery Center at Kandahar Air Field. Several more reports and manuscripts will look into a variety of issues experienced by acutely concussed personnel, such as balance performance or sleep disturbances. In addition, this coordination has helped set up a prospective study investigating in-theater mental health outcomes following concussion that will investigate mental health issues following combat exposure. The overarching goal of this particular effort is to improve in-theater surveillance of postconcussion syndrome and associated mental health issues.

I think in a year or two, people will look back at this establishment of a research program at the CRCC and start to see how profoundly important the Joint Combat Casualty Research Team's mission at Camp Leatherneck was to understanding mTBI, specifically, and as a model for how medical research can be conducted within a deployed military setting.

With regard to projects initiated at Camp Leatherneck, application of scientific methodologies to improve diagnostic capabilities, introduce evidence-based assessments, and understand health outcomes following mTBI will help Navy Medicine providers refine their care and treatment of mTBI. For example, one major success last year was the APGAC battery Simple Reaction Time test in acutely concussed patients. First, this gives in-theater providers, especially younger clinicians, an evidence-based procedure to evaluate their patients. Remember that the type and volume of mTBI being seen at places like the CRCC is tremendous, and a large-scale commitment to assess and treat mTBI is relatively new; very few providers had seen a large volume of combat-related mTBI prior to arrival. Giving a tool to augment



Navy CAPT Lanny Boswell and LT Jacob Norris (NHRC) stand outside the Afghan Cultural Center at Camp Leatherneck. CAPT Boswell directed the JC2RT mission for Spring–Summer 2011. As part of a joint mission, JC2RT's leadership rotates between the services. The director during Fall–Winter 2011 was Air Force COL Karen Weis (not shown).

the clinician's judgment during those first few months in theater enhances the care that the service member receives. Second, the APGAC informs research efforts that may improve noninvasive testing for mTBI. In this case, research and development will be able to leverage the knowledge gleaned using the APGAC to reduce timelines in the development of future noninvasive testing for mTBI.

I think that Camp Leatherneck's successes and those of my JC2RT colleagues in theater, like Navy MSC scientist LT Chris Olson from Walter Reed National Military Medical Center, demonstrate to Navy Medicine that having uniformed medical research personnel in an operational or clinical setting in the theater of war is a viable means to improve health outcomes. Such teams catalyze the collection of valuable data sets for combat casualty research and promote evidence-based thinking in a deployed military medicine environment. Furthermore, I think that the success of the JC2RT mission as a joint endeavor underscores that tri-service collaborations in the realm of medical research is mutually beneficial.

For the warfighters, the establishment of a research program at the CRCC means they will receive better evidence-based health care that leverages the scientific acumen of all the services. Specifically, military medicine and CENTCOM providers know more today about the recovery process that occurs in the days and weeks following uncomplicated mTBI than ever before. We have enhanced our capabilities to assess physically and psychologically wounded patients and make appropriate return-to-duty decisions.



NHRC's LT Jacob Norris is introduced by CDR Earl Frantz to General Amos, Commandant, USMC during a tour of Camp Leatherneck.

MCT 6

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health outcomes, risk factors, and protective factors), survey processing, data cleaning, and data analysis using SPSS statistical software. The team viewed a demonstration of the unit debrief they gave to unit leaders, and they conducted a mock data collection and analysis scenario. NHRC provides reach-back support for the MCTs; thus, this predeployment training not only prepares the team members for their in-theater mission, but maximizes team cohesion between the MCT and the NHRC BHNAS team.

Members of the current Navy Mobile Care Team-5 (LT Tara Smallidge, research psychologist, and LT Jaclyn Fischer, LCSW) meet with Navy Individual Augmentees from FOB Sharana Postal Attachment, in March 2012.



JTAPIC*Continued From p. 2*

collection. In addition, multiple sources are aggregated, which can result in data conflicts. Therefore, as the data stream comes in, NHRC analytical and clinical staff immediately begin deconflicting inconsistencies, verifying data aggregation accuracy, and enhancing the data with clinical coding that allows advanced analyses to be performed. Because this process begins almost at the time of the event itself, complete casualty anatomical injury profiles, severity indices, and operationally relevant variables (e.g., mounted, dismounted, mechanism, activity at time of injury) data are rapidly available to the DoD community.

Partnership

Recently, NHRC's near real-time casualty injury/illness tracking capability came to the attention of the DoD Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) program office. JTAPIC is the DoD Executive Agent for the development of improved tactics, techniques, and procedures (TTPs) and materiel solutions that prevent or mitigate blast-related injuries. Critical to the JTAPIC mission is the availability of clinical and operational data recent enough to be used to affect that reduce injury today, not at some undetermined point in the future. Consequently, NHRC was selected as a permanent JTAPIC partner and assigned the responsibility of providing highly characterized casualty data in near real-time. During Pentagon meetings in December 2010, the Army Surgeon General and Major General James K. Gilman, Commanding General of the United States Army Medical Research and Materiel Command, Fort Detrick, Maryland, requested that NHRC assist the JTAPIC partnership by providing a detailed injury profile of each U.S. wounded-in-action casualty occurring in OCO within 7 days of the casualty's injury-generating event. Since that date, NHRC's EMED program has succeeded in that directive, consistently providing highly characterized data on each of these U.S. casualties within the prescribed period of time.

This process has multiple steps. Initially, through the JTAPIC partnership, the intelligence community reports tactical data to NHRC on each attack against U.S. assets that generates injuries as the events occur. Tactical data for all mounted events are provided to NHRC by JTAPIC partner National Ground Intelligence Center, and tactical data for all dismounted events are provided to NHRC by JTAPIC partner battle casualty Dismounted Incident Analysis Team. As the tactical data stream in, NHRC analysts immediately begin the process of identifying each casualty. Once the casualty is identified, NHRC's EMED information technology capability begins aggregating operational and medical record data as the casualty moves through the medical chain of evacuation. As the medical data become aggregated, the EMED clinical team quickly starts identifying each casualty, many of whom have 20 or more injuries, then coding each identified injury on taxonomies that describe the severity of the injury. Upon completion of coding, each casualty has a detailed clinical profile that fully describes the nature, scope, and severity of injuries. Within the 7-day prescribed period, each casualty's data are sent back to JTAPIC via a dedicated, classified capability specifically designed for the exchange of this information.

NHRC's Important Contribution to JTAPIC

Once the casualty data have been returned, the JTAPIC partners fuse the NHRC clinical profiles with the tactical data that describe characteristics of the event, such as vehicle type, position in vehicle, nature of attack, and type/size of explosive charge. Once fused, these data become powerful insights into the strengths and vulnerabilities in U.S. materiel assets and TTPs. Because these data are now available in near real-time, DoD materiel developers and operational commanders can take direct action to exploit strengths or correct vulnerabilities. For example, through NHRC's ability to support near real-time injury data, not only can vulnerabilities be identified, but they can also be racked and stacked for remediation because the injury severity data allow vulnerabilities to be rated on the extent that they contribute to overall U.S. mortality and morbidity. This process has resulted in immediate development and fielding of vehicle up-armoring kits and new and enhanced personal protective equipment. NHRC is honored to be a JTAPIC partner, playing a pivotal role in advancing threat reduction, injury mitigation, and injury prevention for the entire DoD community.

Briefs

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mander, and Commander, Walter Reed National Military Medical Center Bethesda, visited NHRC to meet with Commanding Officer, CAPT Gregory Utz, MD, and Prospective Executive Officer, CAPT Lanny Boswell. He received briefings from the Commanding Officer, and the Deployment Health Research, Behavioral Sciences and Epidemiology, Medical Modeling & Simulation, Operational Infectious Diseases, and Warfighter Performance departments.

1-2 MAR 2012: Mr. Mike Galarneau presented an NHRC Expeditionary Medical Encounter Database research poster at the Secretary of the Navy and the Commandant of the Marine Corps Regenerative Medicine Conference in Arlington, Virginia. Senior U.S. scientists presented the latest advances in tissue replacement and regeneration. The conference was attended by Deputy Secretaries Juan M. Garcia, III, and Dr. Jonathan Woodson, Assistant Commandant of the Marine Corps; Gen. Joseph Dunford; Lt Gen Willie J. Williams; and MG James K. Gilman, Commander, U.S. Army Medical Research and Materiel Command, Fort Detrick; VADM Matthew L. Nathan, Surgeon General of the Navy, Chief of Navy Bureau of Medicine and Surgery; RADM Michael H. Anderson, MC, The Medical Officer to the Marine Corps, Director, Health Services, Headquarters, USMC; RADM Elizabeth S. Niemyer, Navy Nurse Corps, Deputy Chief, Navy Bureau of Medicine and Surgery, Wounded, Ill, and Injured (BUMED-M9), and Director, Navy Nurse Corps, BUMED, Human Research Protection Official; and a regulatory expert from the Food and Drug Administration.

16 MAR 2012: RADM Michael H. Anderson, USMC, MC, The Medical Officer to the Marine Corps, Director, Health Services, Headquarters, was briefed on the Recruit Assessment Program (RAP) and may route an endorsement letter to Gen Joseph F. Dunford, Assistant Commandant of the Marine Corps. RAP has over 130,000 recruit subjects enrolled and is an invaluable resource. RAP assesses Marines before entry into the U.S. Marine Corps, providing a complementary view to the Millennium Cohort Study, which surveys service members who are already in the DoD. RAP, which began as a pilot study, currently has no sponsorship to maintain funding.

Welcome Aboard

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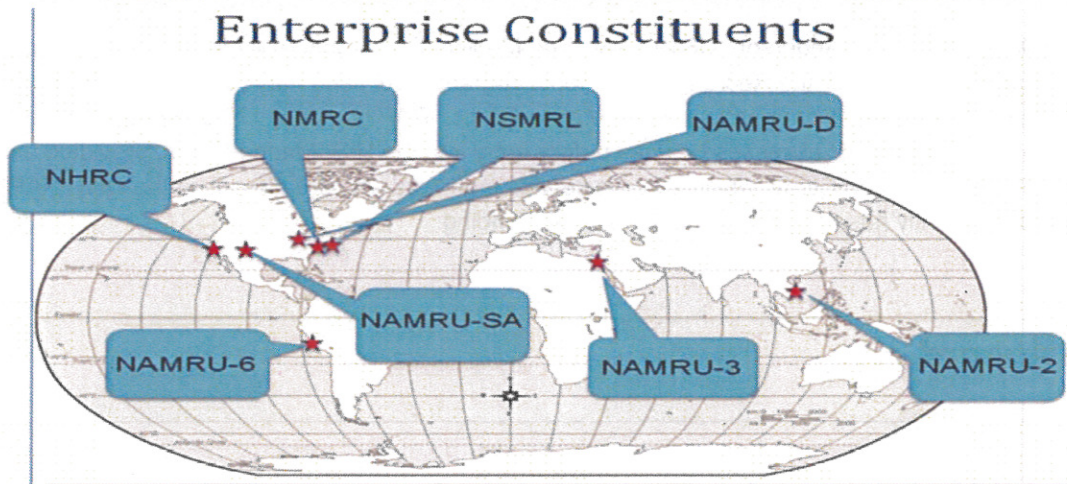
- 6/20/12 **Ms. Lynda Addington**, Henry Jackson Foundation/Research Associate
Operational Infectious Diseases Department, CDR Gary Brice
- 6/21/12 **Gary Brice, CDR, MSC**/Department Head
Operational Infectious Diseases Department, Dr. Karl Van Orden
- 7/2/12 **Ms. Monica Phariss**, Axiom/Clinical Analyst
Medical Modeling & Simulation Department, Mr. Mike Galarneau
- 7/3/12 **Ms. Barbie Ortiz**, Evolution Enterprises Inc./Acquisitions Administrator
Fiscal Department, Ms. Enequina Montenegro
- 7/9/12 **Ms. Toni Rush**, Henry Jackson Foundation/Data Analyst
Deployment Health Department, Dr. Nancy Crum-Cianflone
- 7/20/12 **Rachel Lee, LCDR, MC**/Research Physician
Operational Infectious Diseases Department, CDR Gary Brice
- 7/23/12 **Ms. Raechel Del Rosario**, Henry Jackson Foundation/Clinical Research Coordinator
Deployment Health Department, Dr. Nancy Crum-Cianflone
- 7/30/12 **Ms. Holly Stevenson**, Innovative Solutions/Registered Nurse
Warfighter Performance Department, CDR Thomas Herzig



CAPT Gregory Utz
Commanding Officer

Commanding Officer's Corner

Status Report: Enterprise Research Project Manager (eRPM)



This figure shows the labs that comprise the Navy Medicine research and development enterprise that now have access to eRPM. The labs make up a premier research network whose vision is to provide world-class and operationally relevant healthcare solutions and capabilities research that is responsive to the U.S. Navy and Marine Corps, the Navy Bureau of Medicine and Surgery, and the Department of Defense in support of fleet operational readiness.

The Naval Health Research Center in San Diego, California, and the Naval Medical Research Center (NMRC) in Silver Spring, Maryland, are partnering to introduce an electronic record and management system that can be used to track research projects within the network of eight laboratories that make up the NMRC Enterprise. The Enterprise Research Project Manager (eRPM) is an information management system designed to assist research and development laboratories and their higher echelon commands to effectively manage portfolios and facilitate individual project workflow. This application allows project information to be collected, aggregated, and made readily available for reference. eRPM enables timely project

analysis and a comprehensive view of all programs within the enterprise portfolio. It supports the generation of metrics across the enterprise and at the local lab level. eRPM enables Navy Medicine leadership to monitor budgets, risks, and timelines, and to better align research activities with mission objectives. Additionally, eRPM supports the development of timely information in response to ad hoc requests for information (RFIs) from stakeholders such as members of congress, Navy/Marine Corps leadership, program sponsors, and public affairs officers.

eRPM features include the ability for users to:

- track and report on the progress of their projects;
- perform ad hoc queries across the enterprise;
- view completed products;
- document responses to unfunded ad hoc RFIs from outside agencies;
- access military news links;
- keep abreast of current funding opportunities; and
- view dynamic summary reports at the lab and enterprise levels.

The eRPM is based upon a legacy system used by NHRC and the Military Operational Medical labs, previously managed by NHRC. Efforts are currently under way to institutionalize eRPM by converting it from Microsoft Access to an SQL application hosted on BUMED SharePoint for easier user access, greater data security, and creation of a central repository for the system information and product library. Conversion of eRPM to SQL is expected to be essentially complete by the first quarter of FY13. The request to add this enterprise capability has been submitted to the BUMED-M6 Information Management/Information Technology Governance process for approval.

Following successful conversion to SQL, launch of the new eRPM on the BUMED SharePoint site, and after a period of user familiarization, eRPM is expected to streamline information management of Navy medical research in our enterprise. Principle investigators will be able to enter work unit or project data once, then update information and milestones in a few minutes per month. Program managers and leadership will be able to directly search for research information, summarize research across the enterprise, check for progress and milestones, and obtain simple or complex reports with a few keystrokes in minutes, rather than in the days or months that it currently requires.

— by Jan Dickieson, Karl Van Orden & Gregory Utz

NAVAL HEALTH RESEARCH CENTER SAN DIEGO



Mailing Address

Naval Health Research Center
140 Sylvester Road
San Diego, CA 92106-3521

Email: NHRC-info@med.navy.mil

Phone: (619) 553-8400 Fax: 619-553-9389
<http://www.med.navy.mil/sites/nhrc>

Editor: Michelle LeWark

Design: NHRC Public Affairs

Contributors: CAPT Gregory Utz, Dr. Karl Van Orden, LT Jacob Norris, Dr. Nancy Crum-Ciaflone
Mr. Mike Galarneau, LCDR Katie Shobe, Dr. Shan Putnam, Dr. Ramona McCaffrey

Mission: To conduct health and medical research, development, testing, evaluation, and surveillance to enhance deployment readiness of DOD personnel worldwide

Vision: World-class health and medical research solutions anytime, anywhere.